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rower spores ($11-18 \times 4-5\mu$) these commonly *distinctly fusiform*, and by the tendency of the laciniae to become *torulose*. As in *R. gracilis* there is no reaction with potash. No American specimens of the *R. rigida* stock have yet been examined showing a medullary coloration on application of KHO, and it is certain that in Nylander's sense our southern examples must be referred to either *R. gracilentia* (Ach.) Nyl. Mon. Ram. p. 19, or *R. gracilis* (Pers.) Nyl. l. c. p. 17.

The so-called northern form of *R. rigida* that Willey in New Bedford Lichens thinks in its larger states may be referable to *R. gracilentia* has distinctly straight, ovoid or oblong-ellipsoid spores $8-15 \times 4-6\mu$ with the apothecia rather terminal than otherwise (in *R. rigida* and its allies commonly lateral). The form in no way resembles *R. gracilentia* and it is thought best to revive Tuckerman's name of *R. tenuis* for its designation. Very similar forms are collected in Florida, showing that it is not exclusively northern, and the character cited by Tuckerman for his *R. rigida*, of "besprinkled often with white warts," may only be applied to states of this species.

Rockland, Maine.

NOTES ON THE FRUITING SEASON OF SOME OF THE MOSSES.

PHEBE M. TOWLE.

Altho Dr. H. W. Arnell, of Upsala, Sweden, published, in 1875, a long list of the mosses of his country, giving their blooming and fruiting season and the time required for the development of their sporophytes, and Dr. A. Grimme brought out, in "Hedwigia," 1903, a similar list for Germany, yet, so far as the writer is aware, no extended list of this nature has been made for any part of America.

Not only do the months for the blooming and the fruiting vary with the latitude and the climate, but the length of time required for the development also varies under differing conditions. So if a list should in time be made for Burlington, Vt., for instance, it would not wholly agree with a list made for a locality further south. In fact, in an instance to be mentioned later, the dates for northern Vermont do not agree with those for the region of New York City.

Dr. Arnell, in THE BRYOLOGIST for May, 1905, mentions the value of observations repeated for several years for the sake of medium dates. The necessity for securing average dates has been emphasized by the late springs of 1906 and 1907, as compared with the early spring of 1905. In the latter year we had a warm April. But in 1906 on my first trip afield in the middle of April I found ice under the leaves on the slopes, and the flat was a sheet of ice. The first warm days began May 14th.

In 1905 *Mnium sylvaticum* is recorded as shedding spores the latter half of April, while in 1906 the same species, in shady places in town, did not open their lids until May 16th, the third warm day, while *Mnium affine ciliare* was several days later. Altho the development of these mosses was delayed by the cold spring their blooming time was apparently not affected; for the blooming time of both years was the same month—June, the 15th of the

month being about the middle of the blooming time. Taking the average of the three years, *Mnium sylvaticum* shows the blooming time to be June and the fruiting time the latter half of April and May, time ten or eleven months. For *Mnium affine ciliare*, blooming in June, the fruiting time is the following May, time eleven months.

Mnium Drummondii, of which I felt uncertain, (See THE BRYOLOGIST IX, 3, 55) has been verified by Dr. Grout. It occurs near *Mnium affine*, which is abundant while *Mnium Drummondii* is rare. They correspond in dates.

I first noticed the Giant Bryum [or *Rhodobryum roseum* in fruit in the early spring several years ago, a little clump of it near the drive in Fair Holt. The notes, however, have been made from material in Ethan Allen Park. It is a large, rather handsome moss with the leaves somewhat crowded into a large rosette at the top. The sporophytes are usually clustered. The female plants are abundant, the male rare. On Sept. 20, 1906, I found both kinds of rosettes with their antheridia and archegonia beginning to open. By Oct. 1st their blooming time seemed to be over; the antheridia had discharged their antherozoids and the archegonia which had not been fertilized were turning brown.

The following spring, April 24th, the rosettes showed the sporophytes developing. They could be distinguished with the naked eye and well seen with the hand lens. In September this moss had sporophytes, from two to four in a cluster, which were tall and green with a suggestion of brown. They were pretty closely watched until Nov. 27th when they were reddish-brown but their lids were on tight. On April 24, 1907, I found these sporophyte capsules with their lids mostly off, altho a few were on, and the spores shedding freely.

According to these observations for Burlington, Vermont, the blooming time of *Rhodobryum roseum* is the latter half of September and the fruiting season the latter half of April, time one year and seven months. But Dr. Grout gives the blooming time in the vicinity of New York City as August and early September, and the fruiting time as autumn.

Another beautiful little moss is *Bartramia pomiformis*. It forms a mat of bright green, fruits freely, and the capsules, as the name indicates, are somewhat spherical or apple shaped. It is monoicous, and is quite abundant at Fair Holt.

On June 14, 1906, the rosettes of this moss showed antheridia and archegonia that were old and brown, also those that were fresh, open, and active, and still others that were not full grown. In October, the new sporophytes were seen with the aid of a hand lens. Following on till the next spring they were mature and shedding spores by the middle of May; time, eleven months.

On May 16th, in the *Bartramia pomiformis* from Fair Holt, the sporophytes were shedding spores, but in the material from near Colchester Point, some of the capsules had their lids on as late as May 26th.

Prof. Jones tells me that there is about the same difference, ten days, in the blossoming of the willows on the hill and the lake shore. Those near the cold water of the lake are about ten days later.

This illustrates in a small way the variations due to different climatic conditions in the same latitude and in near by places.

Jan. 17, 1908.

Burlington, Vermont.